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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/826,503	04/05/2001	Charles H. Carter JR.	CM03024J	7883

7590 09/08/2004

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EXAMINER	
GRAHAM, ANDREW R	
ART UNIT	**PAPER NUMBER**
2644	4

DATE MAILED: 09/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/826,503	CARTER, CHARLES H.	
	Examiner	Art Unit	
	Andrew Graham	2644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 June 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

The amendments made to Claims 5 and 6 in the response submitted on June 21, 2004 are acknowledged. The previous objections to these claims are hereby withdrawn.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 5-6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 5 recites the limitation "the at least one digital signal processor" in lines 12 and 13 and again in lines 14 and 15. However, two "at least one digital signal processors" have been referred to at that point in the claims, one in line 4 and one in line 11, rendering unclear to which 'at least one digital signal processor' this reference is referring. This discrepancy may be corrected by either referring to the "at least one digital signal processor" in line 11 as "the at least one digital signal processor" or adding qualifiers to the references to digital signal processors of lines 12-13 and 14-15, such as for lines 12-

13, "the at least one digital signal processor to which the compensated microphone signal is supplied". This rejection also applies to the reference to a "the at least one digital signal processor" in lines 3-4 of **Claim 6.**

The amendments made to **Claims 7 and 8** are acknowledged and the previous rejections made under 35 U.S.C. 112 are hereby withdrawn.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yeap (USPN 4118601) in view of Wong et al (USPN 5881103) and Eatwell et al (USPN 5481615). Hereafter, "Wong et al" and "Eatwell et al" will simply be referred to as "Wong" and "Eatwell", respectively.

Yeap discloses a basic method and system for equalizing an audio transducer system. The basic system, shown in Figure 1, involves a testing phase for the output transducer of the system, with the switches (S1,S2,S3) in the position shown, wherein the signal from the noise generator (28) bypasses the equalizer (10) and is output by the speakers (12) of the system (col. 3, lines

61-66). The emitted signal is received by the microphone (30) connected to the system, which then applies the signal through an amplifier (22) to the equalizer (10) (col. 3, lines 66-68 and col. 4, lines 1-4). This input signal to the equalizer enables the frequency bands of the signals to be variably adjusted to establish a desired characteristic (col. 4, lines 4-20). After the desired frequency responses are established, the original sound generator (26) is reconnected through switching to input a sound signal into the equalizer (10), which then emits the processed signal through the speaker (12) of the system. The noise source (28) is characterized by Yeap as emitting either white or pink noise (col. 2, lines 66-68). The signal generated by the noise generator (28) reads on "providing a source of pseudo random noise" and the manner in which the noise signal is emitted and received reads on "directing the pseudo random noise to an input of a microphone". The resulting response and frequency characteristic adjustments of the equalizer (10) read on "adjusting first coefficients in at least one digital signal processor connected to the microphone". After the adjustments have been made, the switching of the input source of the generator to the audio source (26) reads on "discontinuing the source of pseudo random acoustical noise" and "returning the portable communications device to an operational mode".

While Yeap discloses a basic, pseudo random noise based calibration system for an audio processing device, Yeap does not specify:

- that the speaker the emits the test noise signal is an external speaker of a portable communications device
- that the microphone that receives the test noise signal is a microphone of a portable communications device
- that the coefficients adjusted are those that effect the processing of the microphone
- that the calibration process is applied to multiple speakers

Wong discloses a method and system for adjusting the signal processing of a portable communications devices which is connected to a plurality of auxiliary input and output signal devices. Wong notes that such device are built with certain specifications that may not meet the required level of quality in the presence of an accessory device. Wong discloses the use of a programmable filter (208) and individual coefficients (416) associated with an auxiliary device for adjusting the characteristics of signals emitted or received through the auxiliary or accessory device (col. 3, lines 46-58). The equalization is performed for signals of the auxiliary devices that are received and emitted via the other parts of the radio communication device (110), which includes the standard input and output transducers as well as the transceiver radio system (col. 3, lines 55-61). The method of establishing the equalizing parameters is illustrated in Figure 5, and similar to Yeap, involves the application of a sample signal across the accessory

and comparing the actual response with the reference audio response (col. 4, lines 24-39). The context of equalizing the input and output transducers of a radio read on "A method for acoustic transducer calibration in a portable communications device". The obvious approaches for 'applying' a sample signal across an accessory component, taken particularly in view of the teachings of Yeap, read on "providing a source of pseudo random acoustical noise to an characterized external speaker source separate from the portable communications device" with the obvious obtaining of the actual signal emitted by a speaker reading on "a microphone used with the portable communications device". The relevant adjusting of the coefficients (416) associated with the microphone (411) reads on "adjusting first coefficients in at least one digital signal processor connected to the microphone for a desired microphone frequency response". The characterization of a particular audio device also reads on "discontinuing the source of pseudo random acoustical noise from the external speaker" (col. 4, lines 24-41).

To one of ordinary skill in the art at the time the invention was made, it would have been obvious to implement the calibration system of Yeap into the portable communications scheme of Wong. Wong suggests a similar calibration scheme, however, does not disclose the details. Implementing the calibration system of Yeap would have been motivated by the well-defined and repeatable testing signal of such a system. The benefits of including such a system in the arrangement of Wong

would have been the multiple locations and manners in which the desired changes would have been stored, as well as the ability to adapt and process the signals from a plurality of communications interface devices.

While the processing of Wong would have naturally involved all forms of inputs and outputs of the portable communications system, the system of Yeap in view of Wong does not explicitly specify:

- that one of the output speakers for applying the test noise signal is the internal speaker of the communications device

Eatwell discloses a system for maintaining the desired sound at the ear of a listener, wherein the involved actuator is that of a hand held communications device (col. 3, lines 31-41). A specific signal is passed through the actuator (7) of the device and then picked up by a signal sensor (8), as is generally shown in Figure 3. This signal emitted by the sensor (8) is then compared with a delayed version of the originally emitted signal to establish the signal upon which the equalizer of the system is to be adjusted (col. 4, lines 3-14). Figure 7 illustrates an embodiment of a structure that is disclosed by Eatwell as being particularly useful in a telephone (col. 7, lines 7-20). In view of the previously cited teachings of Yeap and Wong, the incorporation of such a system with the hand held communications device speaker reads on "applying the source of pseudo random

acoustical noise to an internal speaker source in the portable communications device". The inherent amplitude required by the sensor to obtain a useful sensor signal (9) from the standard telephone actuator (7), particularly in view of the teachings and amplifier of Yeap, reads on "increasing the amplitude of the pseudo random acoustical noise such that it can be detected by the microphone". The resulting changes made to the equalization filter (2) with the adjustment (5) and desired signals (1), in view of the individual coefficient scheme for each device in the system of Wong, reads on "adjusting the second coefficients in the at least one digital signal processor for a desired internal speaker frequency response".

To one of ordinary skill in the art at the time the invention was made, it would have been obvious to incorporate the calibration of an internal telephone speaker as taught by Eatwell into the combined system of Yeap in view of Wong. Wong teaches the equalization of multiple input and output devices for a portable communications device, and Eatwell clearly discloses the use of the built-in communications interface of a telephone hand set as being one of these input/output devices, thus explicitly extending the range of application of the teachings of Wong as well as Yeap. Particular motivation for combining the teachings of Eatwell would have been the various possible signal processing schemes illustrated in the different embodiments of the invention of Eatwell, such as the inclusion of the series or parallel inclusion of the equalization filter with other processing

components. The reference of Eatwell is relied upon herein to clearly demonstrate the desire and previously known teachings involved with the equalization of an internal speaker of a telecommunications device. The teachings of Wong include a two way portable communications device, which is well known in the art to include a similar such internal speaker.

Regarding **Claim 2**, Wong illustrates the use of a filter (454) for compensating the signals emitted by the external speaker (451) (col. 3, lines 62-66 and Figure 4). Eatwell also discloses the use of filters for compensating for the characteristics of a component used in obtaining an emitted version of a signal (col. 4, lines 3-13). These two teachings read on "utilizing a filter between the source of pseudo random acoustical noise and the external speaker to compensate for irregularities in the frequency response of the external speaker".

Regarding **Claim 3**, Wong discloses the comparison of a resulting applied signal to the desired response of a reference version of the same signal (col. 4, lines 30-39). Eatwell discusses the formation of a misadjustment signal (5), which corresponds to the difference between the original signal (4) and the obtained sensor signal (9) (col. 4, lines 3-7). The resulting signals of these two teachings read on "comparing the output of the at least one digital signal processor with an optimal acoustic signal from the output of the pseudo random

acoustic noise to provide an error signal for adjusting the coefficients of the at least one digital signal processor".

Regarding **Claim 4**, Wong discloses that a sample signal is applied to an accessory device, and that the digital signal processor includes the capability of driving the analog voice signal lines for an accessory (col. 3, lines 15-19 and col. 4, lines 33-39). The DSP also includes a memory (207) for storing information related to the signal processing performed by the filter (208) part of the processor (col. 3, lines 11-19). The obvious generation of the sample signal from the digital signal processor, based on its signal processing and device driving capabilities reads on "the source of pseudo random noise is from the at least one digital signal processor". It is also noted that the ability and incorporation of a digital signal processor for establishing a pseudo random noise signal for transducer calibration is well-known in the art; the reference of Harris (USPN 5339362), column 11, lines 59-62, has been included with this office action to provide support for such a position.

Regarding **Claim 5**, please refer to the like teachings of Claims 1-4, noting the obvious, if not inherent, use of the digital signal processor of Wong for performing the comparison and component characterization cited therein.

Regarding **Claim 6**, Eatwell discloses the use of a delay element (4) in the signal processing path between the signal source and the formation of the misadjustment signal (col. 4, lines 3-7 and 30-34). This reads on "delaying the source of

pseudo random noise compared with the output of the at least digital signal processor for synchronizing the source of pseudo random noise with the output of the at least one digital signal processor".

Regarding **Claim 7**, please refer to the like teachings of Claims 1, 3, and 4, noting particularly adjustment of microphone coefficients taught by Wong, and the involvement of an internal microphone of Eatwell.

Regarding **Claim 8**, please refer to the like teachings of Claims 1, 3, and 4, noting particularly adjustment of loudspeaker coefficients taught by Wong, and the involvement of an internal speaker of Eatwell.

Response to Arguments

Applicant's arguments filed June 21, 2004 have been fully considered but they are not persuasive.

On page 7, lines 1-2, the applicant has stated, "Yeap does not calibrate the actual transducer (microphone or speaker) but rather manipulates a plurality of filter banks to adjust for the room acoustics". The examiner respectfully notes that Yeap is taken in view of Wong for the rejection of the limitation relevant to this statement, not Yeap alone. As stated in the above rejection, the system of Yeap involves the emitted signal being received by the microphone (30) connected to the system, which then applies the signal through an amplifier (22) to the equalizer (10) (col. 3, lines 66-68 and col. 4, lines 1-4).

Accordingly, these adjustments are clearly made in connection with the signal received by microphone. The emitted signal is output by the system speaker (12), and accordingly, the adjustments are also clearly made in connection with the signal output by the speaker. Both the microphone (30) and the speaker (12) are involved with this manipulation of filter banks of the equalizer (10). In an operational mode, these adjusted filter parameters are associated with the output of the speaker. Thus, the results of outputting a test signal through a speaker are used to adjust the output parameters of a non-test signal output through the same speaker, which, overall, is a method of calibration. The reference of Wong is applied to illustrate that such equalization may be applied to coefficients associated with both input and output devices, one involved output device being an external speaker, and Wong notes that this equalization may be associated with multiple accessory devices, which may collectively impact the processing of a signal (Figure 4, lines 14-58). Second, the adjustment in regards to room acoustics is not excluded from the limitations of the methods disclosed by the applicant, as they are currently claimed. It is particularly noted that "environmental factors" are listed as one of the reasons that transducers appear to have poor operational characteristics in the applicant's specification on page 1, lines 20-24.

On page 7, lines 7-9, the applicant has stated, "Yeap would not work in a portable environment (as thus is not combinable

with Wong) because Yeap's filter banks (ten of them) need to be manually monitored through several indicators and manually tuned". The examiner respectfully submits that the test for obviousness is not whether the features of a reference may be bodily incorporated into the structure of another reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. In this case, the teachings of Yeap suggest the equalization of a system component using inputs and outputs that are received and emitted through transducers involved with a single system, and Wong teaches that such equalization may be performed with particular input and output components of a communications device. It is further noted that Yeap does not specify any size requirements for the disclosed system.

On page 7, lines 12-13, the applicant has stated, "Eatwell does not adjust a response of the speaker for a desired response". The examiner respectfully disagrees. The system of Eatwell includes an equalization filter (2), which is adapted (12) based on a comparison of a specific signal in terms of a version of this same signal received through a feedback microphone (8) (col. 3, lines 62-67 and col. 4, lines 1-14). A flat frequency response is disclosed as the ideal frequency response (col. 1, lines 3-8). Figure 4 illustrates a system that includes a cancellation filter, to which the applicant has

referred, but such a system can still be seen to include an equalization filter (2).

On page 7, lines 15-16, the applicant has stated, "Yeap does not use the pseudo random noise for calibrating a transducer" and "Yeap uses pseudo random noise to drive the filters with a known amplitude". The examiner respectfully disagrees. As cited briefly above, in the adjusting and analyzing mode of Yeap, adjustments are made to the filters based on a microphone (30) input. This microphone (30) input is received from the sound emitted by a speaker (12). The adjusted filter parameters are then applied to a desired sound source that is emitted through the speaker (12), and Yeap notes that the equalization indicators remain operational in this mode (col. 4, lines 40-45). Accordingly, the equalization performed therein involves both the microphone (30) and the speaker (12), with the operational mode using the adjusted filter parameters to affect the speaker output. Wong teaches that both input and output devices may be equalized, with separate associated parameters. As such, the teachings of Yeap in particular view of Wong are interpreted herein to disclose the equalization of a transducer with the pseudo acoustic noise. This parallels the second statement cited above, made by the applicant. The driving of each of the filters at known amplitudes in each frequency is the calibration of the transducer output, because the amplitude and frequency are based on the previous, unfiltered output of the transducer. Again, Wong discloses the equalizing of an input or

output component, based on the application of a sample signal and the determination of the desired frequency response for the component (col. 4, lines 23-57).

On page 7, lines 21-23, the applicant has stated that the dependent claims 2-4 and 6 further provide limitations to the independent claims. As the arguments related to the independent claims have been addressed above, the rejections of these dependent claims are also maintained.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew

Graham whose telephone number is 703-308-6729. The examiner can normally be reached on Monday-Friday, 8:30 AM to 5:00 PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bill Isen can be reached on (703)305-4386. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Andrew Graham
Examiner
A.U. 2644

ag
August 30, 2004

XU MEI
PRIMARY EXAMINER